

CLAIMS

What is claimed is:

1. A method for providing a window regulator cable assembly comprising the steps of:

 mounting a cable drum wheel, a first top pulley wheel and a first bottom pulley wheel in a spaced apart relationship to form a subassembly;

 mounting a cable arrangement to provide cable runs between the cable drum wheel, the top pulley wheel and the bottom pulley wheel, wherein at least one of the cable drum wheel, the top pulley wheel and the bottom pulley wheel is spaced from another of the cable drum wheel, the top pulley wheel and the bottom pulley wheel by at least one semi-rigid tube that surrounds an associated cable run, and the at least one semi-rigid tube is subject to an axial load to maintain tension in the cable arrangement; and

 mounting the subassembly on a rigid frame to remove the axial load from the at least one semi-rigid tube.
2. The method as defined in claim 1 wherein the rigid frame is a vehicle door.
3. The method as defined in claim 1 further including the step of removing at least one semi-rigid tube after the step of mounting the subassembly on the rigid frame.
4. The method as defined in claim 1 wherein the at least one semi-rigid tube is made of an extruded plastic material.
5. The method as defined in claim 4 wherein the plastic material is selected from PVC and polyethylene.
6. The method as defined in claim 1 wherein the at least one semi-rigid tube is substantially straight.
7. The method as defined in claim 1 wherein the at least one semi-rigid tube includes a longitudinal slit that allows mounting of the at least one semi-rigid tube on the cable run and allows for removal of the at least one semi-rigid tube from the cable run.

8. The method as defined in claim 1 wherein the step of mounting the first top pulley and the second top pulley includes pivotally mounting the first top pulley wheel and the first bottom pulley wheel by a first top pivot and a first bottom pivot, respectively, wherein the first top pivot and the first bottom pivot are mounted on a first rigid member.

9. The method as defined in claim 8 further including a first semi-rigid tube mounted on the cable run between the cable drum wheel and first top pulley wheel and a second semi-rigid tube mounted on the cable run between the cable drum wheel and the first bottom pulley wheel.

10. The method as defined in claim 9 further including the steps of pivotally mounting a second top pulley wheel on a second top pivot and a second bottom pulley wheel on a second bottom pivot, and mounting the second top pivot and the second bottom pivot on a second rigid member spaced laterally from the first rigid member.

11. The method as defined in claim 10 wherein one of the cable runs between the first top pulley wheel and the second bottom pulley wheel include one of the semi-rigid tubes and wherein one of the cable runs between the second top pulley wheel and the first bottom pulley wheel includes one of the semi-rigid tubes.

12. The method as defined in claim 1 further including a plurality of cable runs and two cable runs of said plurality of cable runs intersect and at least one of the two cable runs includes one of the semi-rigid tubes to prevent contact between the two cable runs.

13. The method as defined in claim 1 further including the step of engaging a cable tensioning system having a resiliently mounted deflector on a portion of one of the cable runs to deflect said portion laterally and increase the effective length of the one of the cable runs.

14. The method as defined in claim 1 wherein the cable assembly further includes at least one cable defining a longitudinal direction and having an end mounted in a cable end housing, and the end is biased in the longitudinal direction by a resilient member to shorten the effective length of the cable to tension the cable arrangement.

15. A window regulator cable assembly comprising:
a cable drum wheel, a first top pulley wheel, and a first bottom pulley wheel in a spaced apart relationship;
a cable arrangement mounted on the cable drum wheel, the first top pulley wheel and the first bottom pulley wheel to form a plurality of cable runs between the cable drum wheel, the first top pulley wheel and the first bottom pulley wheel; and
a semi-rigid tube surrounding an associated cable run to temporarily space apart at least one of the cable drum wheel, the first top pulley wheel, and the first bottom pulley wheel from another of the cable drum wheel, the first top pulley wheel, and the first bottom pulley wheel to maintain an initial tension in the cable arrangement before assembly of the cable drum wheel, the first top pulley wheel, and the first bottom pulley wheel onto an associated rigid frame
16. The assembly as recited in claim 15 wherein the semi-rigid tube is made of a plastic material.
17. The assembly as recited in claim 16 wherein the plastic material is selected from PVC and polyethylene.
18. The assembly as recited in claim 15 wherein the semi-rigid tube includes a longitudinal slit that facilitates assembly of the semi-rigid tube on the associated cable run and facilitates removal of the semi-rigid tube from the associated cable run.
19. The assembly as recited in claim 15 further including a second cable run that intersects the semi-rigid tube, and the semi-rigid tube prevents contact between the associated cable run and the second cable run.
20. The assembly as recited in claim 15 further including a cable tensioning system having a resiliently mounted deflector that engages a portion of one of the cable runs to deflect the portion laterally and increase an effective length of the one of the cable runs.

21. The assembly as recited in claim 15 further including at least one cable having an end defining a longitudinal direction and mounted in a cable end housing, and the cable end is biased in the longitudinal direction by a resilient member to shorten an effective length of the at least one cable to tension the cable arrangement.